



wwPDB EM Validation Summary Report ⓘ

Feb 22, 2024 – 03:29 PM EST

PDB ID : 7K0S
EMDB ID : EMD-22615
Title : Cryo-EM structure of rabbit RyR1 in the presence of Mg²⁺ and AMP-PCP in nanodisc
Authors : Nayak, A.R.; Samso, M.
Deposited on : 2020-09-05
Resolution : 4.50 Å(reported)

This is a wwPDB EM Validation Summary Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/EMValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

EMDB validation analysis : 0.0.1.dev70
Mogul : 1.8.5 (274361), CSD as541be (2020)
MolProbity : 4.02b-467
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ : 1.9.13
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

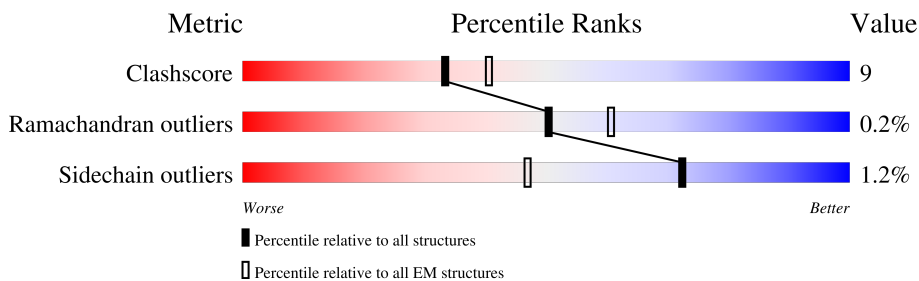
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

ELECTRON MICROSCOPY

The reported resolution of this entry is 4.50 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the EM map (all-atom inclusion $< 40\%$). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	5037	
1	B	5037	
1	C	5037	
1	D	5037	

2 Entry composition [i](#)

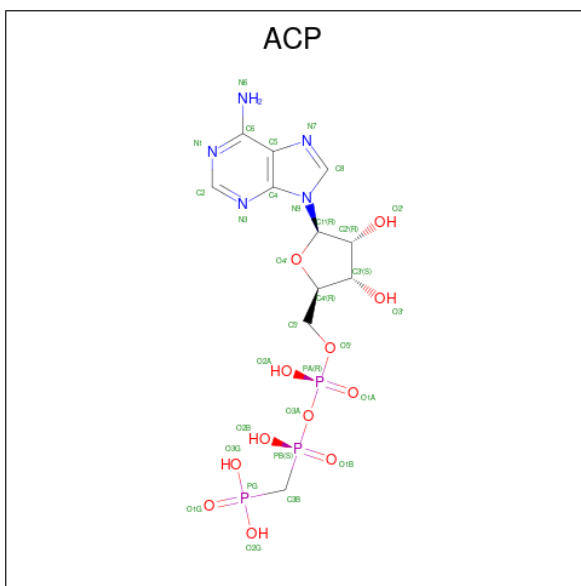
There are 4 unique types of molecules in this entry. The entry contains 115935 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called RyR1.

Mol	Chain	Residues	Atoms					AltConf	Trace
			Total	C	N	O	S		
1	A	4110	Total	C	N	O	S	0	0
			28941	18335	5131	5318	157		
1	B	4110	Total	C	N	O	S	0	0
			28940	18334	5135	5315	156		
1	D	4110	Total	C	N	O	S	0	0
			28963	18348	5134	5324	157		
1	C	4110	Total	C	N	O	S	0	0
			28958	18354	5132	5317	155		

- Molecule 2 is PHOSPHOMETHYLPHOSPHONIC ACID ADENYLATE ESTER (three-letter code: ACP) (formula: $C_{11}H_{18}N_5O_{12}P_3$).



Mol	Chain	Residues	Atoms					AltConf
			Total	C	N	O	P	
2	A	1	Total	C	N	O	P	0
			31	11	5	12	3	
2	B	1	Total	C	N	O	P	0
			31	11	5	12	3	

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Mol	Chain	Residues	Atoms					AltConf
2	D	1	Total	C	N	O	P	0
			31	11	5	12	3	
2	C	1	Total	C	N	O	P	0
			31	11	5	12	3	

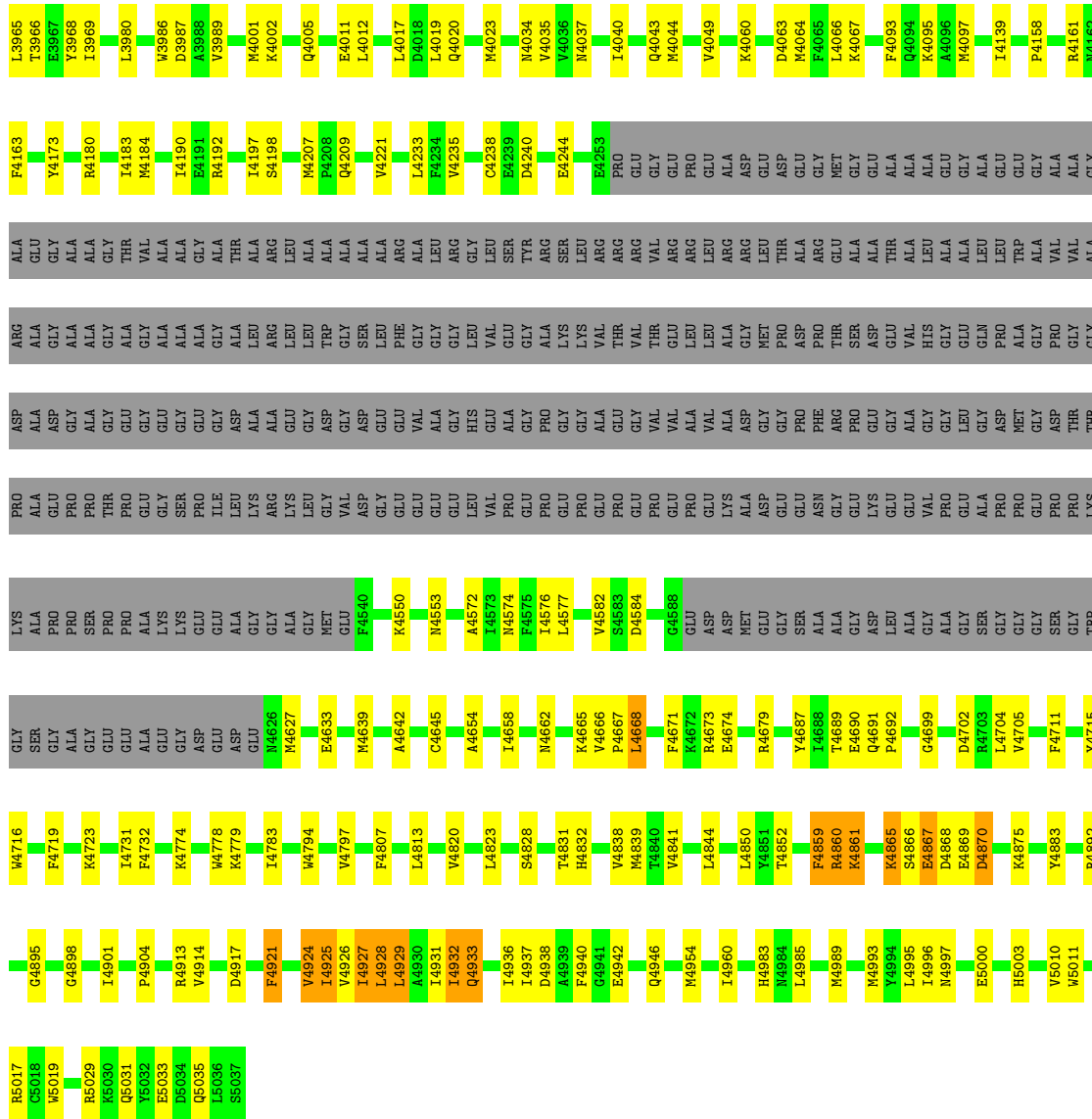
- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		AltConf
3	A	1	Total	Zn	0
			1	1	
3	B	1	Total	Zn	0
			1	1	
3	D	1	Total	Zn	0
			1	1	
3	C	1	Total	Zn	0
			1	1	

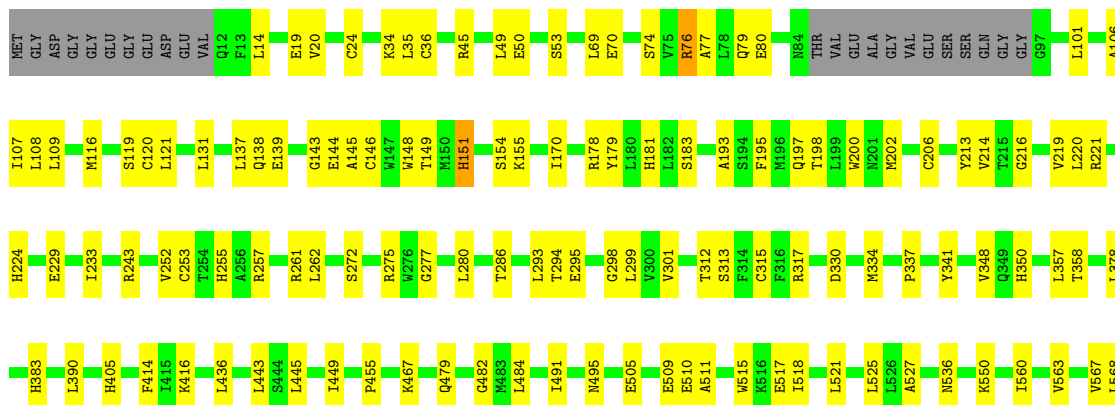
- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg) (labeled as "Ligand of Interest" by depositor).

Mol	Chain	Residues	Atoms		AltConf
4	A	1	Total	Mg	0
			1	1	
4	B	2	Total	Mg	0
			2	2	
4	D	1	Total	Mg	0
			1	1	
4	C	1	Total	Mg	0
			1	1	

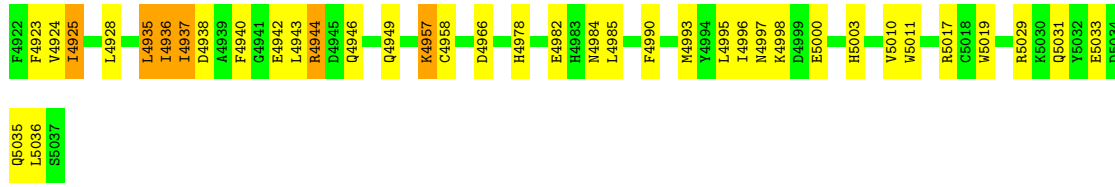
K3821	E3670	X3406	UNK	UNK	L2904	GLU	LYS	ALA	PRO	L2257	E1874	C1724	L1600
K3824	V3702	X3410	UNK	UNK	T2912	LYS	ALA	THR	GLU	T2271	GLU	R1725	M1608
L3835	D3719	X3490	UNK	UNK	L2926	ARG	VAL	ASP	LEU	P2272	GLU	R1727	P1609
S3840	Y3722	X3491	UNK	UNK	E3339	GLY	ALA	ALA	GLU	L2273	GLU	I1735	B1614
N3845	N3729	X3493	UNK	UNK	GLY	GLU	GLU	GLU	GLU	A2276	GLU	W1736	VAL
R3849	N3741	X3494	UNK	UNK	N2734	GLU	F2735	P2477	L2286	L2286	GLU	L1737	GLU
A3853	GLY	X3495	UNK	UNK	D2736	THR	D2736	A2287	L2288	L2288	GLU	P1738	GLU
V3865	GLU	X3535	UNK	UNK	P2737	LYS	P2737	V2299	V2299	V2299	GLU	L1739	ARG
I3866	ALA	X3536	UNK	UNK	T2742	LYS	T2742	C2310	C2310	C2310	GLU	P1740	ARG
D3877	GLU	X3537	UNK	UNK	I2747	LYS	I2747	L2314	L2314	L2314	GLU	R1743	ALA
F3880	E3747	X3544	UNK	UNK	H2763	ARG	H2763	R2330	R2330	R2330	GLU	L1747	GLY
R3886	S3752	X3549	UNK	UNK	W2766	THR	W2766	F2337	F2337	F2337	GLU	L1749	E1622
F3887	F3753	X3550	UNK	UNK	D2769	THR	D2769	F2340	F2340	F2340	GLU	H1760	R1623
L3888	E3754	X3551	UNK	UNK	N2773	THR	N2773	E2348	E2348	E2348	GLU	L1762	G1625
Q3889	E3755	X3554	UNK	UNK	W2776	THR	W2776	M2349	M2349	M2349	GLU	L1771	G1625
L3890	K3756	X3561	UNK	UNK	D2777	THR	D2777	E2348	E2348	E2348	GLU	R1772	W1626
L3891	E3757	X3562	UNK	UNK	Y2777	THR	Y2777	R2356	R2356	R2356	GLU	A1784	A1627
C3892	F3757	X3613	UNK	UNK	Q2778	THR	Q2778	L2356	L2356	L2356	GLU	A1784	Q1631
E3893	F3757	LYS	UNK	UNK	E2779	THR	E2779	L2358	L2358	L2358	GLU	LEU	L1639
F3899	M3758	SER	UNK	UNK	N2780	THR	N2780	R2359	R2359	R2359	GLU	PRO	L1639
Q3906	E3759	LYS	UNK	UNK	W2781	THR	W2781	F2364	F2364	F2364	GLU	ALA	R1646
R3913	K3760	LYS	UNK	UNK	D2782	THR	D2782	X2641	X2641	X2641	GLU	ALA	C1647
L3924	Q3761	LYS	UNK	UNK	E2783	THR	E2783	X2642	X2642	X2642	GLU	ALA	M1648
F3927	R3762	LYS	UNK	UNK	Y2784	THR	Y2784	X2674	X2674	X2674	GLU	GLY	D1649
I3930	L3763	LYS	UNK	UNK	E2785	THR	E2785	X2679	X2679	X2679	GLU	GLU	E1652
W3935	L3764	LYS	UNK	UNK	N2786	THR	N2786	X2688	X2688	X2688	GLU	LYS	R1651
Y3937	F3765	LYS	UNK	UNK	W2786	THR	W2786	X2688	X2688	X2688	GLU	LYS	L1652
D3941	E3766	LYS	UNK	UNK	D2787	THR	D2787	X2691	X2691	X2691	GLU	LYS	R1651
E3944	V3779	LYS	UNK	UNK	E2788	THR	E2788	X2691	X2691	X2691	GLU	LYS	L1652
G3947	M3778	LYS	UNK	UNK	E2788	THR	E2788	X2691	X2691	X2691	GLU	LYS	R1651
M3955	V3779	LYS	UNK	UNK	L2785	THR	L2785	X2691	X2691	X2691	GLU	LYS	L1652
V3957	M3793	LYS	UNK	UNK	K2786	THR	K2786	X2691	X2691	X2691	GLU	LYS	R1651
F3961	T3797	LYS	UNK	UNK	T2787	THR	T2787	X2691	X2691	X2691	GLU	LYS	L1652
F3962	I3804	LYS	UNK	UNK	H2788	THR	H2788	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	P2789	THR	P2789	X2691	X2691	X2691	GLU	LYS	L1652
F3962	L3805	LYS	UNK	UNK	R2792	THR	R2792	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	P2793	THR	P2793	X2691	X2691	X2691	GLU	LYS	R1651
F3961	L3805	LYS	UNK	UNK	Y2794	THR	Y2794	X2691	X2691	X2691	GLU	LYS	R1651
N3963	L3805	LYS	UNK	UNK	K2795	THR	K2795	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	T2796	THR	T2796	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	F2797	THR	F2797	X2691	X2691	X2691	GLU	LYS	R1651
F3961	L3805	LYS	UNK	UNK	K2800	THR	K2800	X2691	X2691	X2691	GLU	LYS	R1651
N3963	L3805	LYS	UNK	UNK	K2810	THR	K2810	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	E2811	THR	E2811	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	S2812	THR	S2812	X2691	X2691	X2691	GLU	LYS	R1651
F3961	L3805	LYS	UNK	UNK	L2813	THR	L2813	X2691	X2691	X2691	GLU	LYS	R1651
N3963	L3805	LYS	UNK	UNK	K2814	THR	K2814	X2691	X2691	X2691	GLU	LYS	R1651
S3964	L3805	LYS	UNK	UNK	E2820	THR	E2820	X2691	X2691	X2691	GLU	LYS	R1651
F3961	L3805	LYS	UNK	UNK	TRP	THR	TRP	X2691	X2691	X2691	GLU	LYS	R1651
N3963	L3805	LYS	UNK	UNK	ILE	THR	ILE	X2691	X2691	X2691	GLU	LYS	R1651



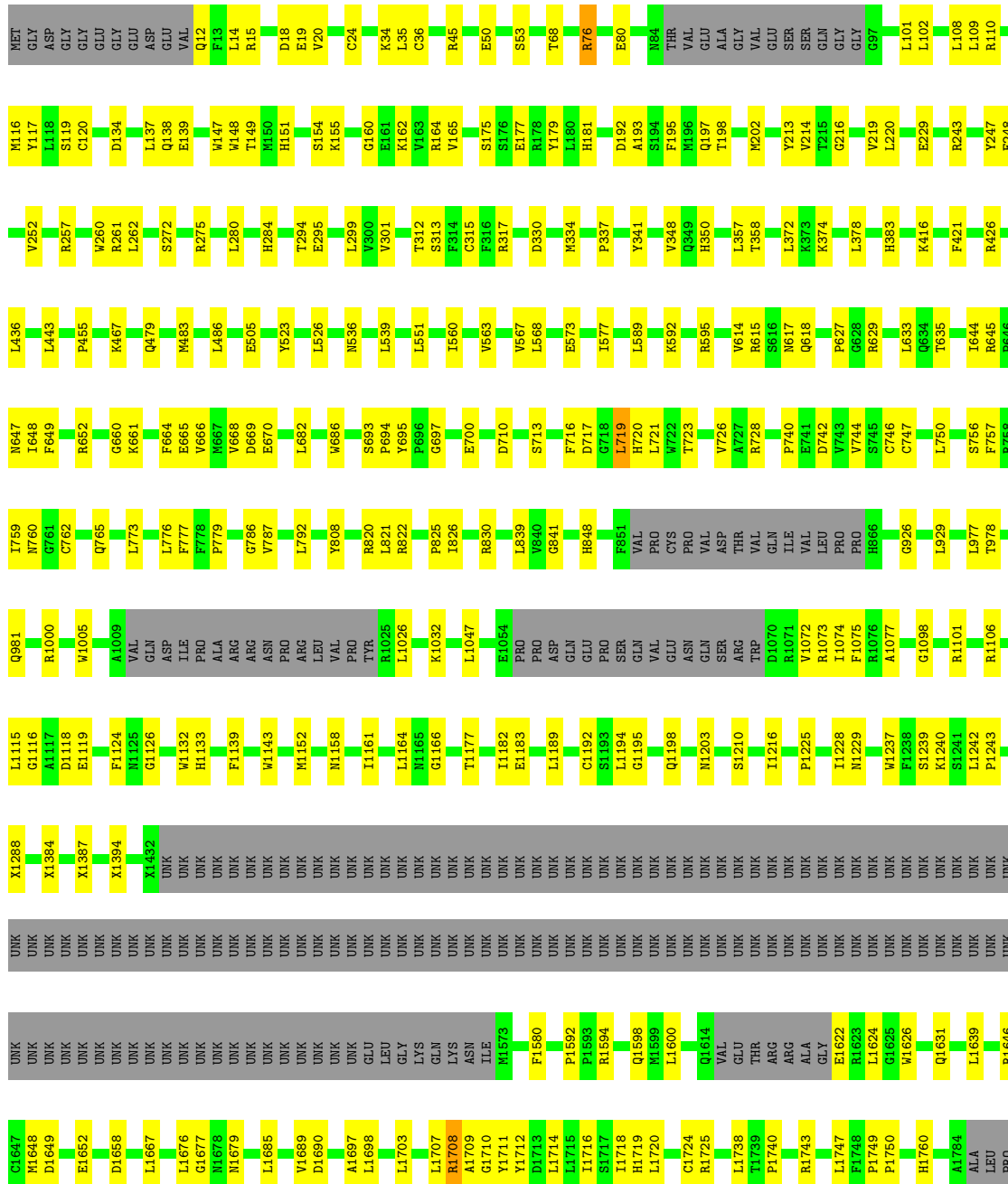
• Molecule 1: RyR1



L4819	V4820	K4821	T4822	L4823	R4824	T4825	L4826	H4832	V4838	V4841	V4849	L4850	T4852	F4859	R4860	K4861	F4862	V4863	M4864	K4865	S4866	E4867	D4868	R4869	D4870	E4871	D4872	D4873	M4874	K4875	D4878	T4881	Y4882	Y4883	Y4888	V4889	R4892	C4895	G4896	I4897	Y4912	R4913	I4918	T4919	F4920	F4921		
F4631	Y4638	M4639	E4640	P4641	A4654	I4658	R4673	E4674	T4689	E4690	Q4691	P4692	Q4700	W4701	D4702	R4703	L4704	V4705	F4711	Y4715	W4716	F4719	K4723	I4731	V4732	I4750	Y4791	W4794	M4796	V4797	L4801	F4807	F4808	H4812	L4813	L4814	D4815	I4816	A4817	M4818	Y4826	M4827	V4828					
L4852	M4853	S4856	A4857	L4857	M4857	L4857	V4882	S4883	D4884	S4885	F4887	G4888	GLU	ASP	ASP	MET	GLU	GLY	SER	ALA	ALA	GLY	LEU	ALA	GLY	ALA	SER	TRP	GLY	SER	ALA	GLY	PRO	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ASP	ASP	ASP	GLY	MET	F4540
G4631	Y4638	M4639	E4640	P4641	A4654	I4658	R4673	E4674	T4689	E4690	Q4691	P4692	Q4700	W4701	D4702	R4703	L4704	V4705	F4711	Y4715	W4716	F4719	K4723	I4731	V4732	I4750	Y4791	W4794	M4796	V4797	L4801	F4807	F4808	H4812	L4813	L4814	D4815	I4816	A4817	M4818	Y4826	M4827	V4828					
L4630	L4031	E4032	G4033	N4034	V4035	V4036	M4037	I4040	Q4043	M4044	M4047	L4048	D4063	L4066	K4067	L4068	I4071	K4095	K4101	Q4102	L4111	F4141	M4142	V4145	P4158	R4161	Y4173	R4180	I4181	I4183	M4184	I4190	E4191	I4192	Y4193	I4195	F4196	I4197	S4198	M4207								
L3924	K3787	M3793	V3794	L3804	L3805	N3809	V3812	Q3813	Q3814	K3815	F3828	R3829	Q3830	S3831	I3832	L3835	M3836	S3840	V3841	L3842	N3845	R3849	A3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	C3892	E3893	G3894	H3895	N3896	F3899	Q3906	I3913							
L3644	P3645	E3655	K3668	I3662	L3663	T3664	O3666	H3667	F3669	R3672	M3673	I3674	D3675	D3676	L3677	E3682	L3716	W3741	GLY	ALA	ALA	GLU	E3747	V3761	S3752	E3755	R3758	E3759	K3760	Y3765	Q3766	Q3767	S3768	R3769	L3770	H3771	R3772	G3774	A3775	M3778	Q3781							
L4030	L4031	E4032	G4033	N4034	V4035	V4036	M4037	I4040	Q4043	M4044	M4047	L4048	D4063	L4066	K4067	L4068	I4071	K4095	K4101	Q4102	L4111	F4141	M4142	V4145	P4158	R4161	Y4173	R4180	I4181	I4183	M4184	I4190	E4191	I4192	Y4193	I4195	F4196	I4197	S4198	M4207								
L4630	L4031	E4032	G4033	N4034	V4035	V4036	M4037	I4040	Q4043	M4044	M4047	L4048	D4063	L4066	K4067	L4068	I4071	K4095	K4101	Q4102	L4111	F4141	M4142	V4145	P4158	R4161	Y4173	R4180	I4181	I4183	M4184	I4190	E4191	I4192	Y4193	I4195	F4196	I4197	S4198	M4207								
R4208	Q4209	L4218	V4235	C4238	L4242	E4283	PRO	GLU	GLY	GLU	GLY	PRO	GLU	LEU	ARG	ALA	ASP	GLU	GLU	GLU	THR	ASP	ALA	GLU	GLY	MET	GLY	ALA	GLY	LEU	TRP	ALA	ALA	THR	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA					
ARG	ALA	LEU	GLY	ARG	GLY	VAL	LEU	SER	TYR	ARG	ARG	ARG	ARG	ARG	ARG	ARG	ASP	GLU	GLU	GLU	THR	ASP	ALA	GLU	GLY	MET	GLY	ALA	GLY	LEU	TRP	ALA	ALA	THR	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA	ALA					
PHE	GLY	GLY	GLY	VAL	GLU	GLY	GLY	ALA	LYS	VAL	THR	VAL	VAL	ASP	GLY	MET	GLU	GLU	GLU	GLY	ASP	PRO	THR	ALA	GLU	THR	ALA	GLY	GLU	GLU	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY				
GLU	VAL	ALA	HIS	GLU	ALA	PRO	GLY	PRO	GLY	GLU	VAL	VAL	VAL	ASP	GLY	ASP	GLY	GLY	GLY	GLY	GLY	PRO	ASP	GLY	THR	PRO	THR	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO			
GLU	GLU	GLU	LEU	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO	PRO		



• Molecule 1: RyR1



Vertical list of amino acid residues with their corresponding PDB IDs, organized into columns. Residues are color-coded: green for good quality, yellow for medium quality, red for poor quality, and grey for unknown quality. Red diamonds indicate specific annotations.

V4064	F4065	L4066	K4067	B4068	K4069	D4092	F4093	Q4094	K4095	M4096	M4097	K4101	F4132	L4139	G4140	F4141	N4142	V4145	F4158	R4159	L4160	R4161	N4162	F4163	Y4173	Y4177	R4180	I4181	L4183	M4184	L4190	E4191	L4193	Y4194	F4195	E4196	L4197	S4198	E4199	N4205	F4206	M4207	V4210
D3941	E3944	E3945	Q3946	A3954	N3963	S3964	L3965	Y3968	I3969	L3980	R3984	I3985	M3986	D3987	A3988	V3989	F3992	F3996	M3999	K4002	L4003	Q4009	I4010	E4011	L4012	L4017	D4018	L4019	Q4020	M4023	V4024	V4025	M4026	L4027	L4030	L4031	N4034	V4035	V4036	N4037	Q4043	D4063	
I3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			
L3805	N3809	V3812	K3815	F3828	F3829	Q3830	S3831	L3832	Q3833	L3834	L3835	S3840	V3841	L3842	N3845	R3849	A3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804					
L3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			
L3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			
L3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			
L3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			
L3662	L3663	T3664	H3667	E3670	D3671	I3674	D3675	D3676	E3682	Y3720	L3721	Y3722	M3723	H3734	N3741	GLY	ALA	GLU	L3853	V3865	I3866	D3877	F3880	R3886	F3887	L3888	Q3889	L3890	L3891	E3892	F3899	L3903	Q3906	I3913	L3924	Q3927	I3930	S3931	Y3937	I3804			

S5087	F4921	I4783	GLY	PRO	THR	GLY	GLY	THR	THR	GLY	VAL	ALA	M4097	L3965	Q3830	M3729	VAL	UNK
F4922	F4923	F4784	TRP	LYS	THR	ALA	GLY	THR	PRO	GLY	ALA	GLY	K4101	Y3988	Q3833	HIS	TRP	UNK
V4924	V4925	T4785	ASP	LYS	PRO	ARG	ALA	ALA	ALA	ASP	ARG	GLU	Q4102	Y3989	Q3834	GLY	HIS	UNK
L4925	L4926	M4798	GLY	PRO	PRO	GLY	GLY	PRO	PRO	ASP	GLY	ALA	F4103	N3976	L3835	LEU	LYS	UNK
L4928	L4929	H4812	ALA	SER	PRO	ALA	ALA	PRO	PRO	ALA	ALA	ALA	T4104	B3984	S3840	LEU	LEU	UNK
L4930	L4931	I4816	GLY	PRO	THR	GLY	GLY	THR	PRO	GLY	GLY	GLY	E4107	L3985	Y3841	SER	SER	UNK
L4932	L4933	V4820	ALA	PRO	PRO	ALA	GLY	GLY	PRO	GLY	ALA	VAL	F4132	W3986	L3842	GLN	GLN	UNK
L4934	L4935	V4823	LYS	LYS	GLY	ALA	GLY	GLY	GLY	GLY	ALA	ALA	P4158	A3988	D3843	ARG	ARG	UNK
L4936	L4937	L4823	GLY	GLY	ILE	GLY	GLY	PRO	PRO	GLY	ALA	ALA	R4161	V3989	N3845	ARG	ARG	UNK
L4938	L4939	V4838	ASP	ALA	LEU	ALA	ASP	LEU	LEU	ASP	THR	THR	Y4173	F3996	A3846	ALA	ALA	UNK
L4940	R4944	M4839	GLY	GLY	LYS	GLY	ALA	LYS	LYS	ALA	ALA	ALA	Y4173	M3999	R3949	VAL	VAL	UNK
F4940	D4945	T4840	ALA	ALA	ARG	ALA	ALA	LYS	ARG	ALA	ARG	ARG	R4180	K4002	A3853	ALA	ALA	UNK
R4944	Q4946	V4841	GLY	MET	LEU	GLY	GLY	LEU	LEU	GLY	TRP	ALA	M4184	L4003	I3866	CYS	PHE	UNK
Q4949	C4958	L4844	GLY	GLY	VAL	GLY	ASP	VAL	VAL	GLY	GLY	ALA	I4190	I4010	D3877	ARG	ARG	UNK
F4959	R4860	Y4851	TRP	LYS	ASP	GLY	GLY	ASP	ASP	GLY	TRP	ALA	E4011	E4011	R3877	MET	MET	UNK
D4956	E4861	F4859	GLY	LYS	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4012	K3760	F3887	UNK	UNK	UNK
H4978	F4862	R4860	GLY	LYS	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4013	K3760	R3762	UNK	UNK	UNK
E4982	R4863	R4860	GLY	LYS	VAL	GLY	GLY	VAL	VAL	GLY	GLY	ALA	D4018	L4017	Q3761	UNK	UNK	UNK
L4985	M4864	F4865	GLY	PRO	PRO	ALA	ALA	PRO	PRO	GLY	GLY	ALA	L4019	L4017	R3762	UNK	UNK	UNK
M4989	E4866	S4866	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4020	L4017	R3762	UNK	UNK	UNK
L4995	D4868	E4867	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4021	L4017	R3762	UNK	UNK	UNK
N4997	E4869	D4870	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
K4998	E4870	D4870	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
E5000	M4874	K4875	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
H5003	C4875	C4875	GLY	PRO	PRO	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
N5011	L4995	L4996	ASP	ASP	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
R5017	L4996	L4997	MET	MET	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
W5019	N4997	K4998	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
R5029	D4999	E5000	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
Q5031	E5000	H5003	LEU	LEU	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
W5052	C5018	C5018	ALA	ALA	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
E5033	W5019	R5029	GLY	GLY	VAL	GLY	GLY	VAL	VAL	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
	F4778	F4779	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	GLY	ALA	L4022	L4017	R3762	UNK	UNK	UNK
	F4779	F4779	ASP	SER	PRO	PRO	PRO	PRO	PRO	PRO	PRO	ALA	L4022	L4017	R3762	UNK	UNK	UNK

4 Experimental information

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C4	Depositor
Number of particles used	68155	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/\text{\AA}^2$)	60	Depositor
Minimum defocus (nm)	1000	Depositor
Maximum defocus (nm)	2500	Depositor
Magnification	105000	Depositor
Image detector	GATAN K2 SUMMIT (4k x 4k)	Depositor
Maximum map value	0.200	Depositor
Minimum map value	-0.126	Depositor
Average map value	0.001	Depositor
Map value standard deviation	0.007	Depositor
Recommended contour level	0.006	Depositor
Map size (Å)	478.72, 478.72, 478.72	wwPDB
Map dimensions	352, 352, 352	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.36, 1.36, 1.36	Depositor

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: MG, ZN, ACP

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	# Z >5	RMSZ	# Z >5
1	A	0.26	0/25057	0.50	1/34021 (0.0%)
1	B	0.27	0/25055	0.50	3/34016 (0.0%)
1	C	0.26	0/25076	0.50	2/34047 (0.0%)
1	D	0.26	0/25078	0.50	2/34045 (0.0%)
All	All	0.26	0/100266	0.50	8/136129 (0.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	C	0	1

There are no bond length outliers.

The worst 5 of 8 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	3751	VAL	C-N-CA	-5.77	107.27	121.70
1	B	719	LEU	CA-CB-CG	5.62	128.23	115.30
1	D	3751	VAL	C-N-CA	-5.62	107.66	121.70
1	D	719	LEU	CA-CB-CG	5.56	128.08	115.30
1	C	4891	VAL	O-C-N	5.30	131.18	122.70

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	C	4892	ARG	Sidechain

5.2 Too-close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	28941	0	24397	483	0
1	B	28940	0	24404	519	0
1	C	28958	0	24429	510	0
1	D	28963	0	24439	493	0
2	A	31	0	14	7	0
2	B	31	0	14	4	0
2	C	31	0	14	3	0
2	D	31	0	14	8	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
3	C	1	0	0	0	0
3	D	1	0	0	0	0
4	A	1	0	0	0	0
4	B	2	0	0	0	0
4	C	1	0	0	0	0
4	D	1	0	0	0	0
All	All	115935	0	97725	1937	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 9.

The worst 5 of 1937 close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:3773:ARG:CB	1:A:3815:LYS:HE3	1.46	1.45
1:C:3765:TYR:CE1	1:C:4750:ILE:HG23	1.52	1.40
1:A:4921:PHE:O	1:A:4925:ILE:HG22	1.27	1.30
1:A:3767:GLN:O	1:A:3772:THR:HB	1.29	1.28
1:D:3674:ILE:HG12	1:D:3769:ARG:CD	1.64	1.28

There are no symmetry-related clashes.

5.3 Torsion angles [i](#)

5.3.1 Protein backbone [i](#)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	3191/5037 (63%)	2943 (92%)	243 (8%)	5 (0%)	47	81
1	B	3191/5037 (63%)	2934 (92%)	247 (8%)	10 (0%)	41	76
1	C	3191/5037 (63%)	2929 (92%)	254 (8%)	8 (0%)	41	76
1	D	3191/5037 (63%)	2932 (92%)	253 (8%)	6 (0%)	47	81
All	All	12764/20148 (63%)	11738 (92%)	997 (8%)	29 (0%)	50	81

5 of 29 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	4866	SER
1	A	4870	ASP
1	B	3662	ILE
1	B	3666	ASP
1	B	4867	GLU

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	2452/3264 (75%)	2421 (99%)	31 (1%)	69	82
1	B	2452/3264 (75%)	2419 (99%)	33 (1%)	69	82
1	C	2455/3264 (75%)	2425 (99%)	30 (1%)	71	84
1	D	2458/3264 (75%)	2431 (99%)	27 (1%)	73	85
All	All	9817/13056 (75%)	9696 (99%)	121 (1%)	72	84

5 of 121 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	4936	ILE
1	C	4875	LYS
1	D	3759	GLU
1	C	4868	ASP
1	C	4944	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 28 such sidechains are listed below:

Mol	Chain	Res	Type
1	D	151	HIS
1	C	4946	GLN
1	D	3761	GLN
1	C	4223	ASN
1	D	2180	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 13 ligands modelled in this entry, 9 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	ACP	D	5101	4	27,33,33	1.37	5 (18%)	32,52,52	1.46	4 (12%)
2	ACP	A	5101	4	27,33,33	1.35	5 (18%)	32,52,52	1.51	5 (15%)
2	ACP	B	5101	4	27,33,33	0.89	1 (3%)	32,52,52	0.84	2 (6%)
2	ACP	C	5101	4	27,33,33	1.33	5 (18%)	32,52,52	1.50	4 (12%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ACP	D	5101	4	-	9/15/38/38	0/3/3/3
2	ACP	A	5101	4	-	5/15/38/38	0/3/3/3
2	ACP	B	5101	4	-	8/15/38/38	0/3/3/3
2	ACP	C	5101	4	-	7/15/38/38	0/3/3/3

The worst 5 of 16 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	5101	ACP	PG-O3G	2.87	1.61	1.54
2	C	5101	ACP	PG-O3G	2.86	1.61	1.54
2	C	5101	ACP	PG-O2G	2.85	1.61	1.54
2	D	5101	ACP	PG-O3G	2.83	1.61	1.54
2	D	5101	ACP	PG-O2G	2.83	1.61	1.54

The worst 5 of 15 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	5101	ACP	PB-O3A-PA	-4.14	119.42	132.56
2	A	5101	ACP	PB-O3A-PA	-4.07	119.65	132.56
2	D	5101	ACP	PB-O3A-PA	-3.87	120.27	132.56
2	A	5101	ACP	N3-C2-N1	-3.70	122.90	128.68
2	C	5101	ACP	N3-C2-N1	-3.65	122.98	128.68

There are no chirality outliers.

5 of 29 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	5101	ACP	C5'-O5'-PA-O1A
2	A	5101	ACP	C5'-O5'-PA-O3A

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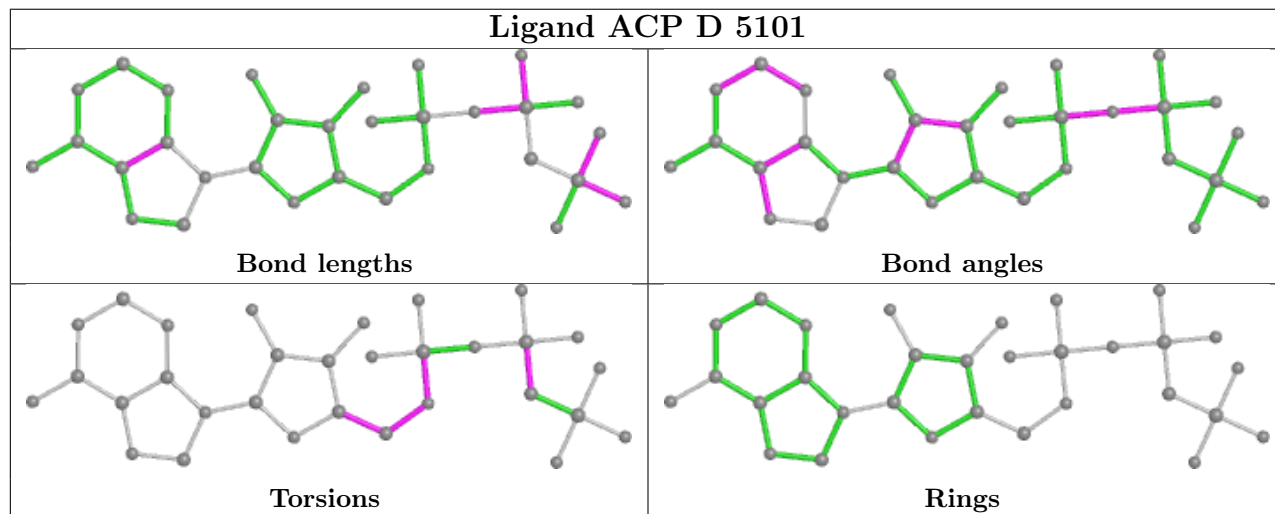
Mol	Chain	Res	Type	Atoms
2	B	5101	ACP	PG-C3B-PB-O1B
2	B	5101	ACP	PG-C3B-PB-O3A
2	B	5101	ACP	C5'-O5'-PA-O2A

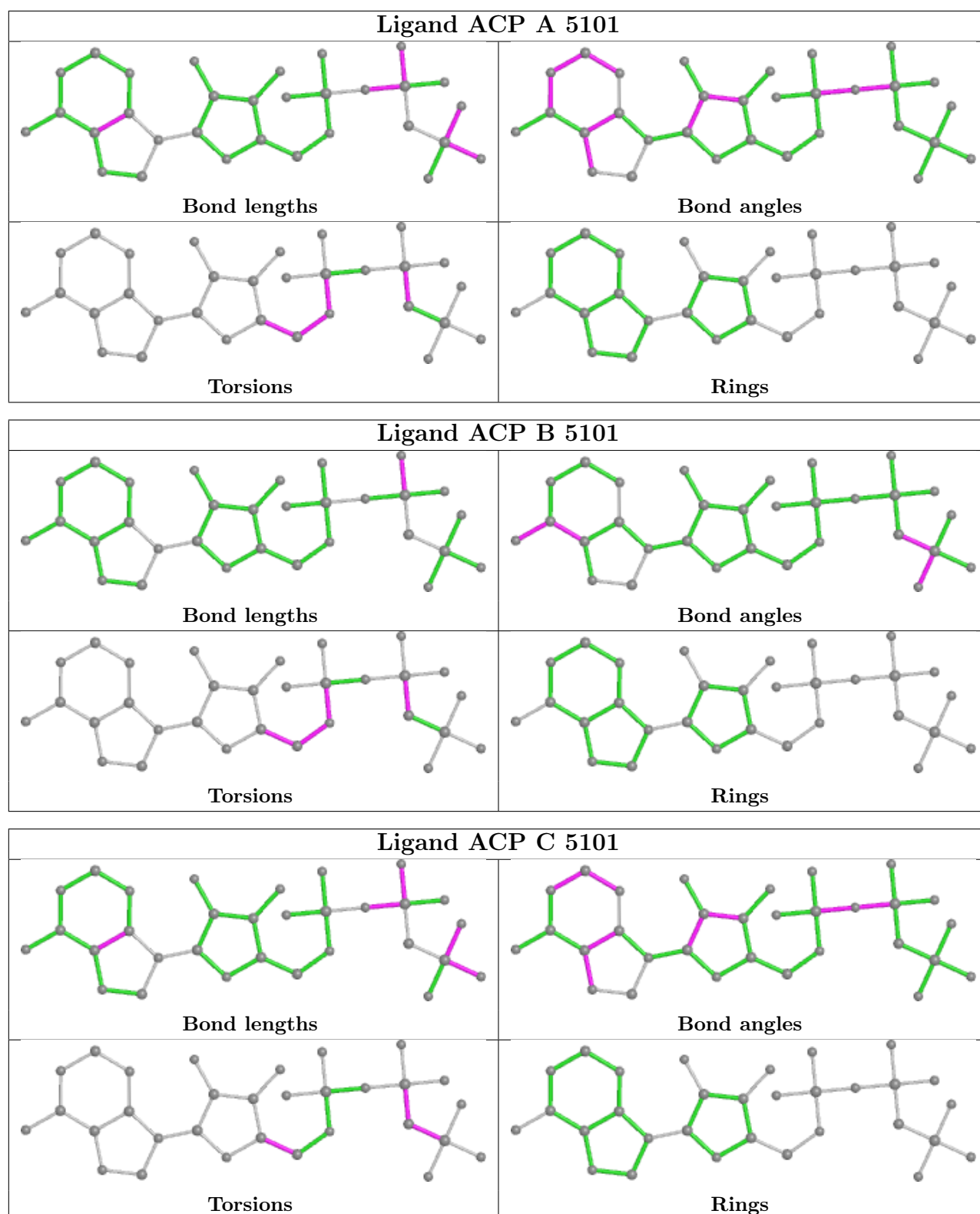
There are no ring outliers.

4 monomers are involved in 22 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	5101	ACP	8	0
2	A	5101	ACP	7	0
2	B	5101	ACP	4	0
2	C	5101	ACP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.





5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	D	6
1	B	6
1	C	6
1	A	6

The worst 5 of 24 chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	D	3302:UNK	C	3303:UNK	N	17.16
1	B	3302:UNK	C	3303:UNK	N	17.15
1	C	3302:UNK	C	3303:UNK	N	17.10
1	A	3302:UNK	C	3303:UNK	N	17.01
1	A	3510:UNK	C	3511:UNK	N	16.97

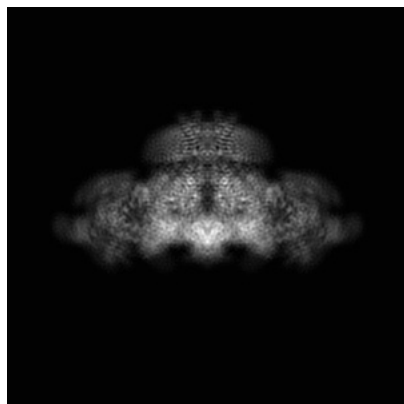
6 Map visualisation [i](#)

This section contains visualisations of the EMDB entry EMD-22615. These allow visual inspection of the internal detail of the map and identification of artifacts.

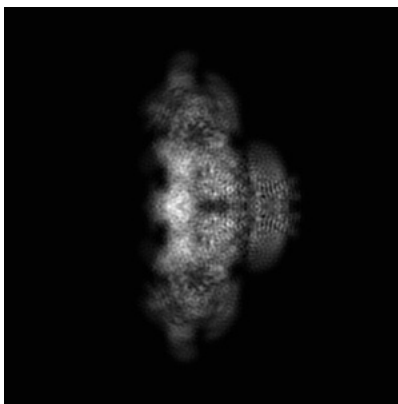
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections [i](#)

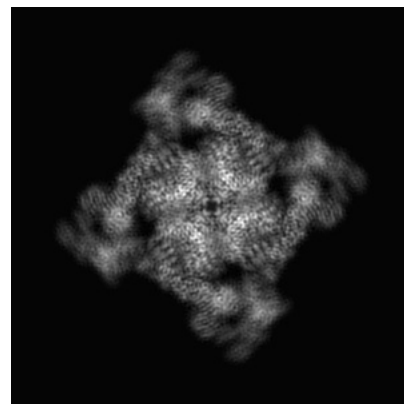
6.1.1 Primary map



X

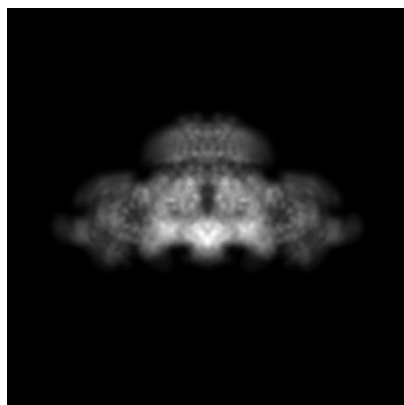


Y

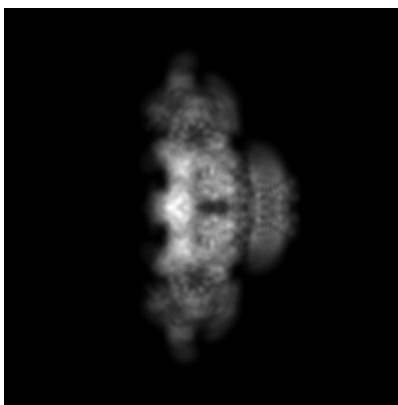


Z

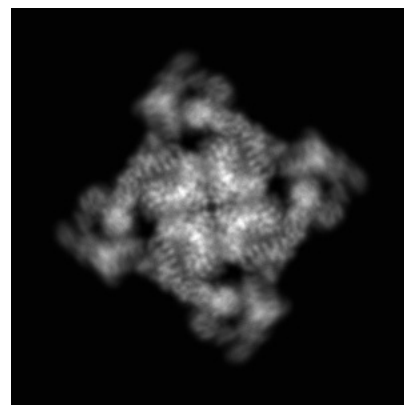
6.1.2 Raw map



X



Y

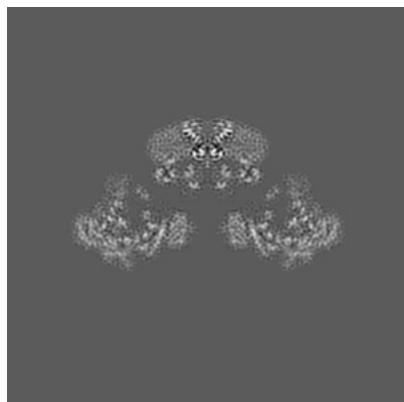


Z

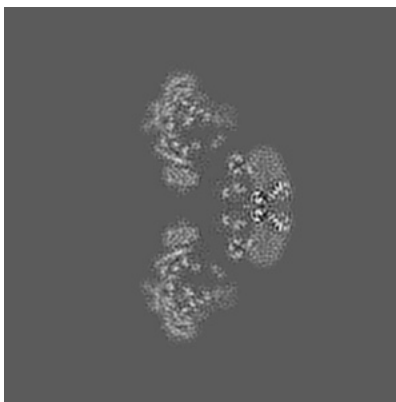
The images above show the map projected in three orthogonal directions.

6.2 Central slices [i](#)

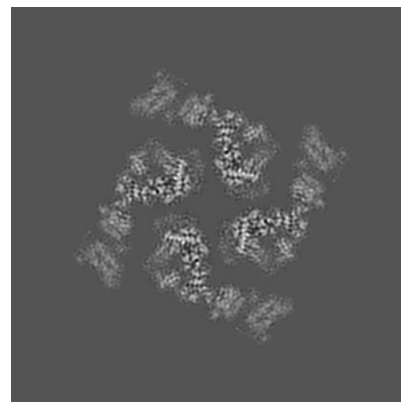
6.2.1 Primary map



X Index: 176

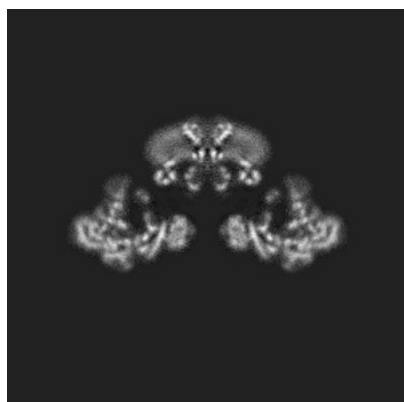


Y Index: 176

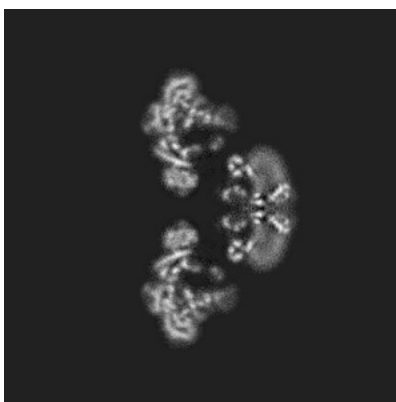


Z Index: 176

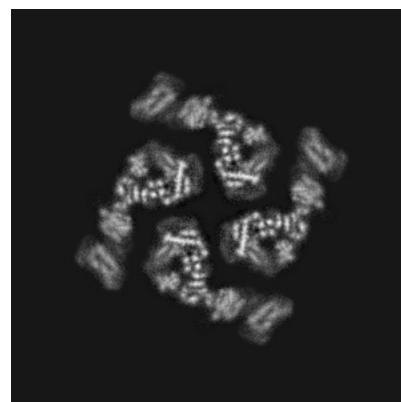
6.2.2 Raw map



X Index: 176



Y Index: 176

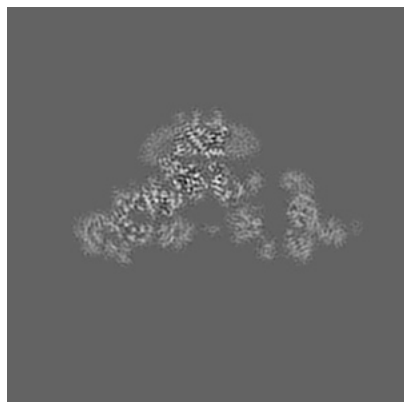


Z Index: 176

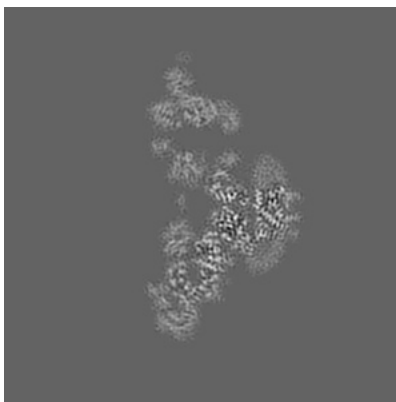
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices [i](#)

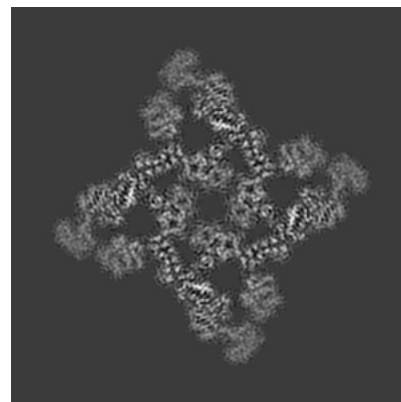
6.3.1 Primary map



X Index: 165

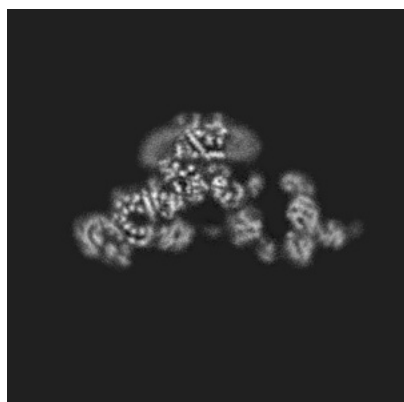


Y Index: 187

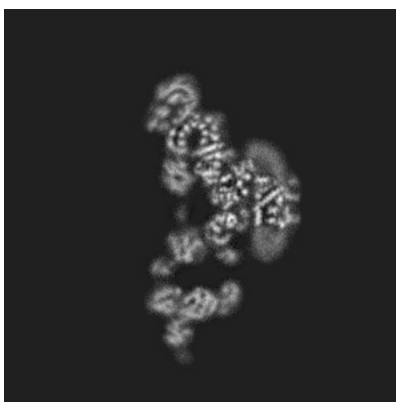


Z Index: 160

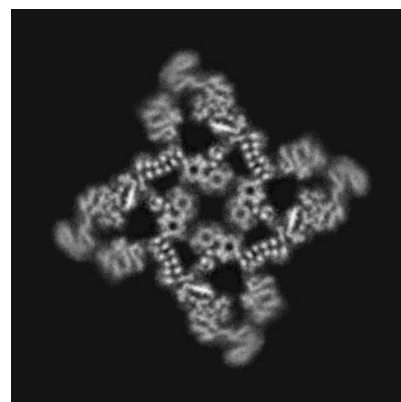
6.3.2 Raw map



X Index: 165



Y Index: 165

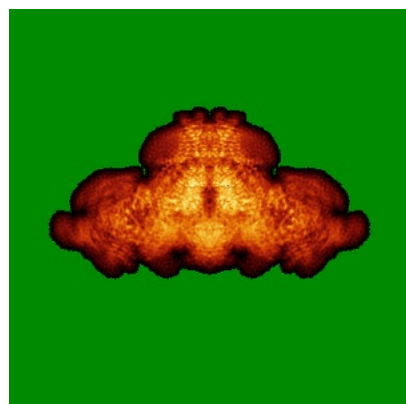


Z Index: 160

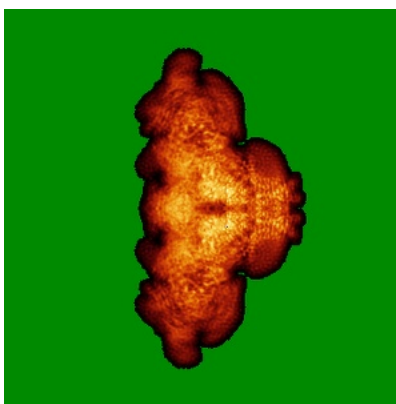
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) [i](#)

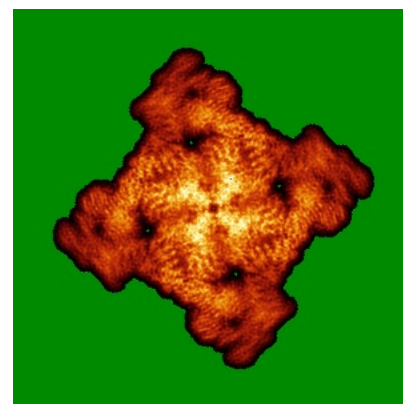
6.4.1 Primary map



X

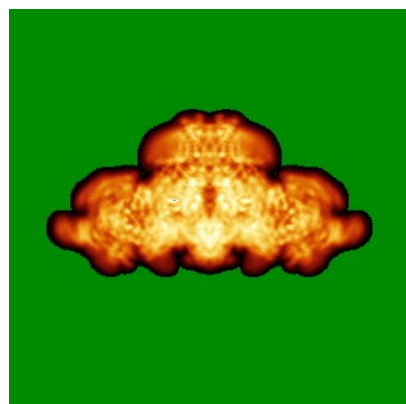


Y

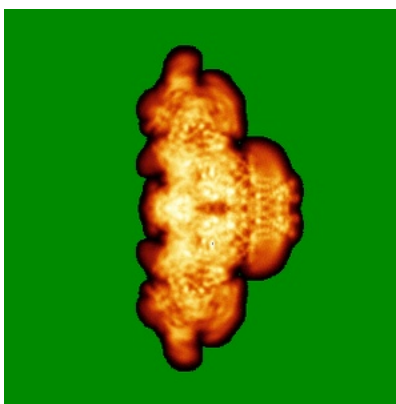


Z

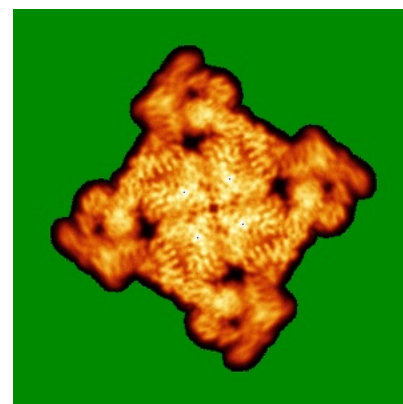
6.4.2 Raw map



X



Y

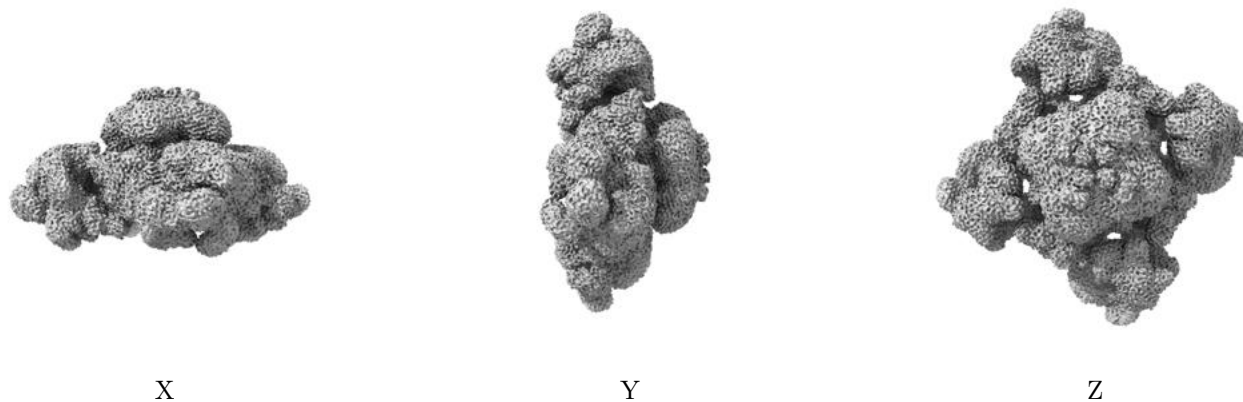


Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

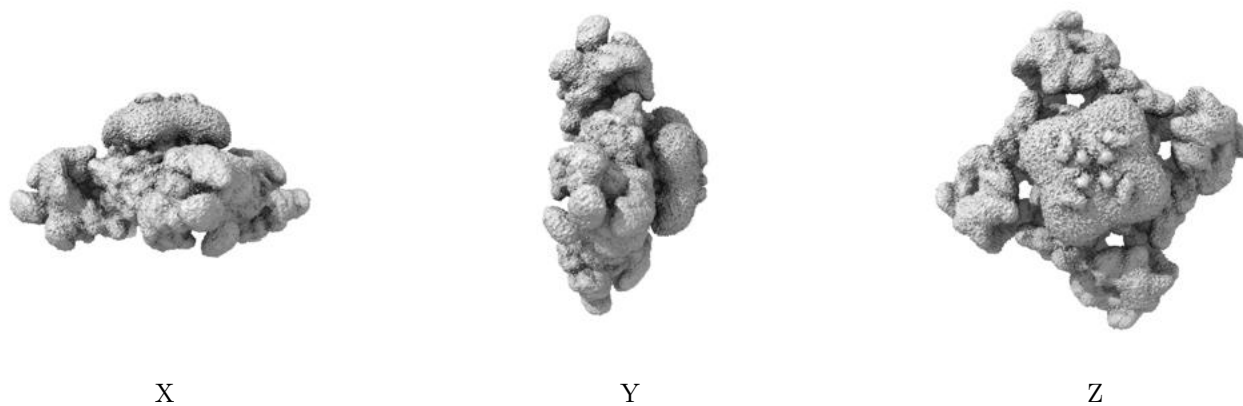
6.5 Orthogonal surface views [i](#)

6.5.1 Primary map



The images above show the 3D surface view of the map at the recommended contour level 0.006. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

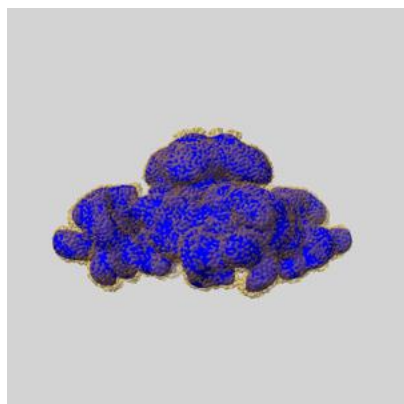
6.6 Mask visualisation [i](#)

This section shows the 3D surface view of the primary map at 50% transparency overlaid with the specified mask at 0% transparency

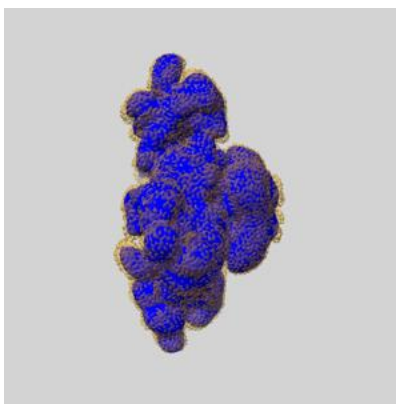
A mask typically either:

- Encompasses the whole structure
- Separates out a domain, a functional unit, a monomer or an area of interest from a larger structure

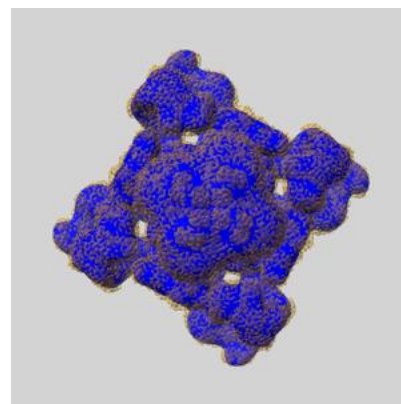
6.6.1 emd_22615_msk_1.map [i](#)



X



Y

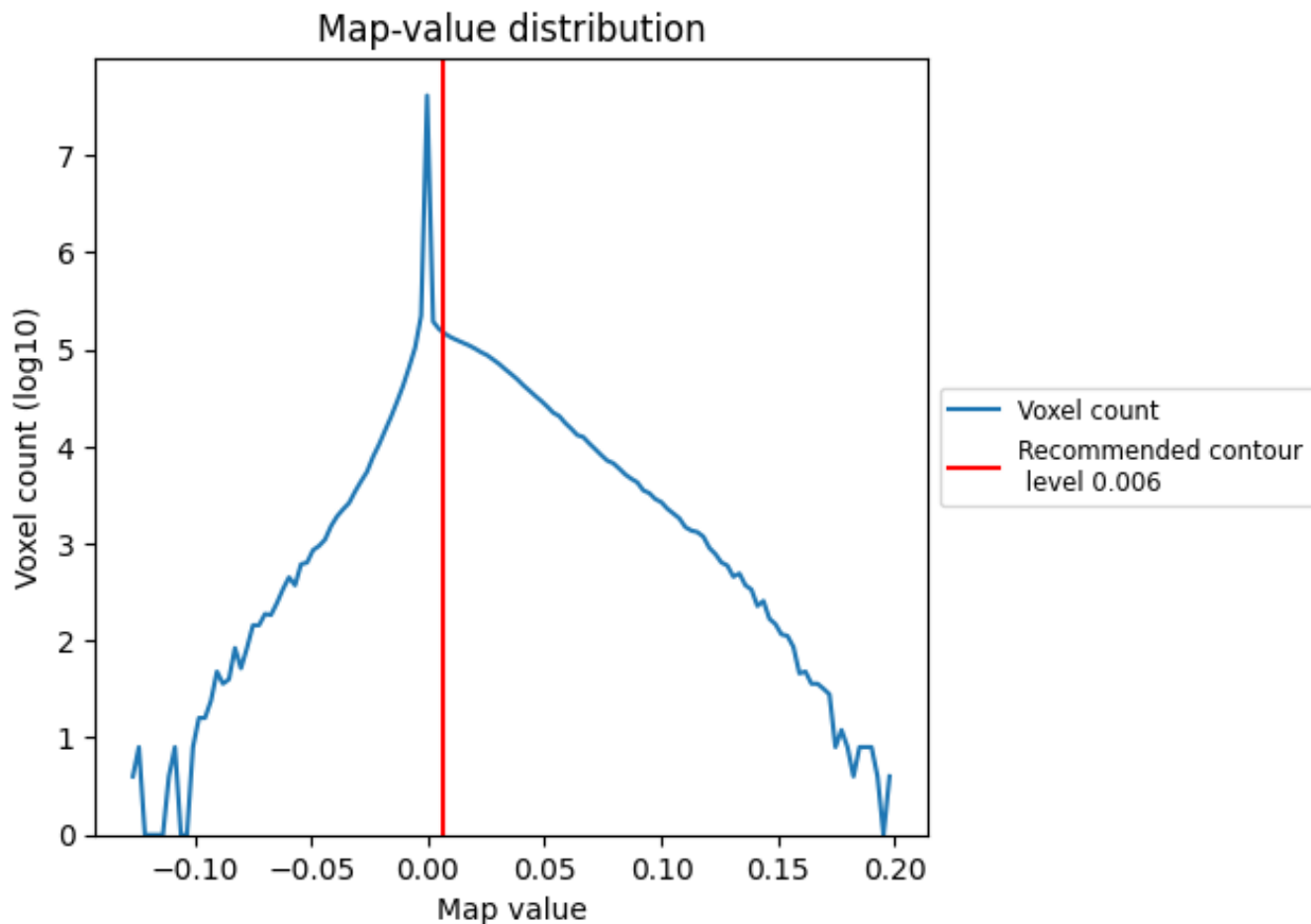


Z

7 Map analysis [i](#)

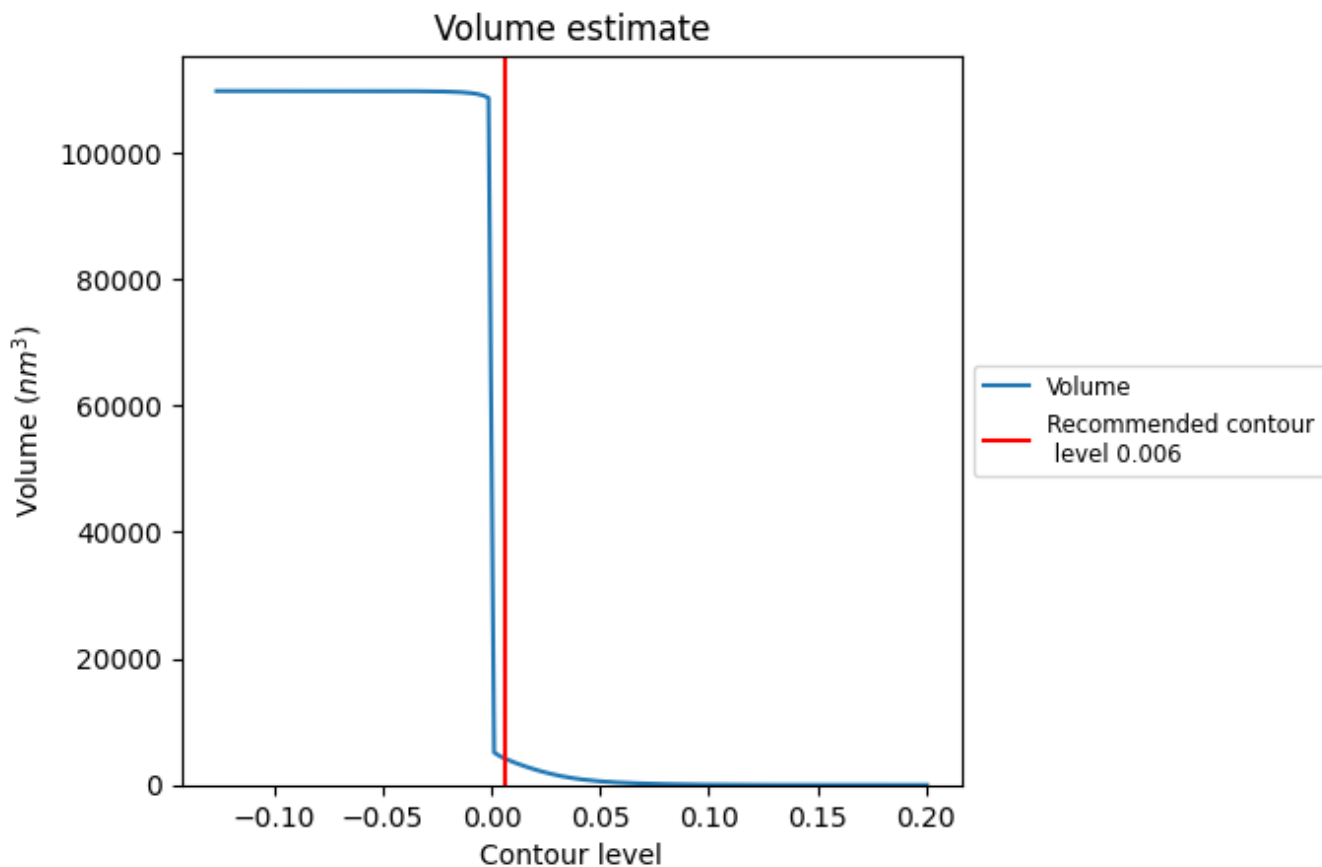
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution [i](#)



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

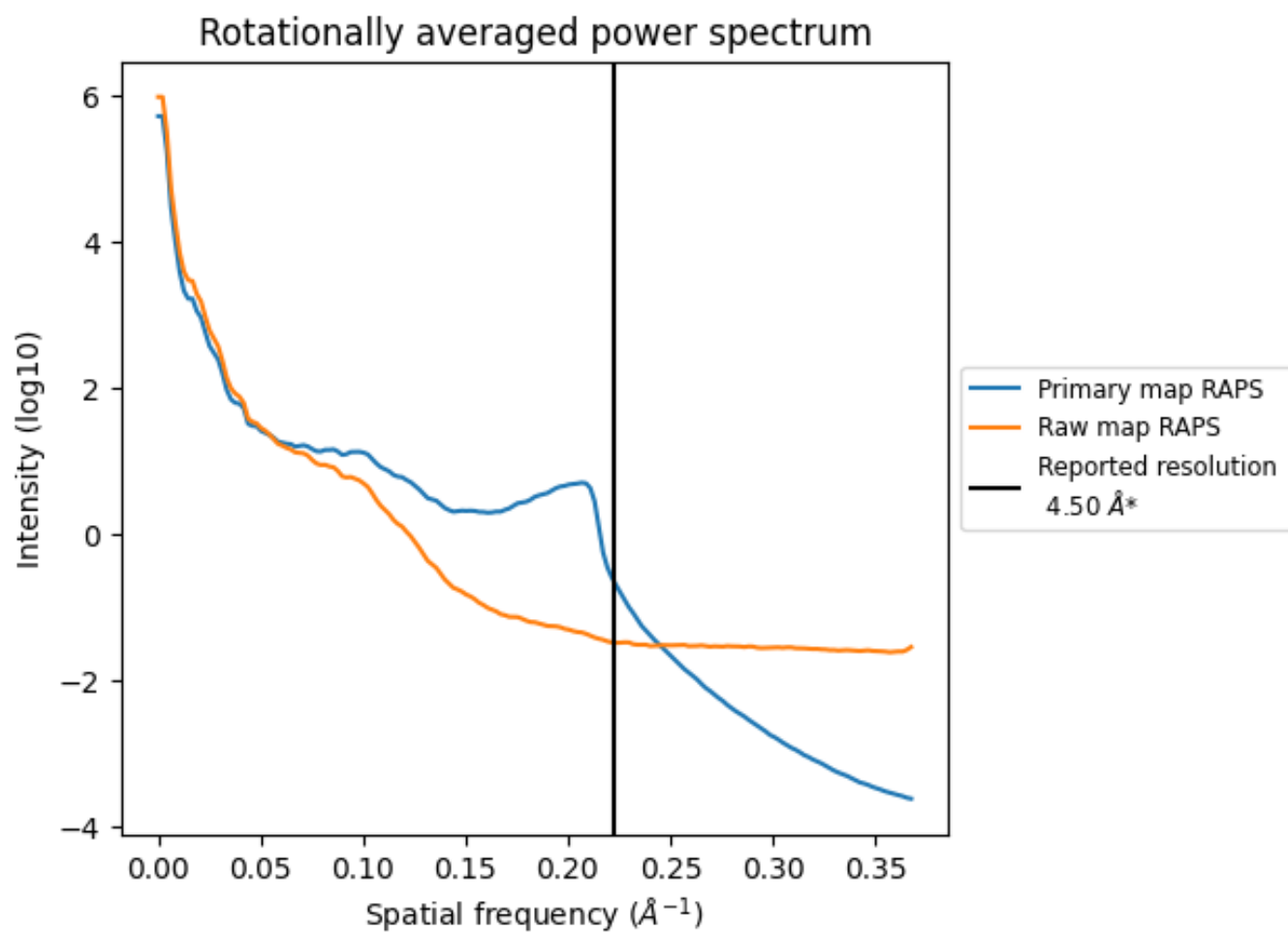
7.2 Volume estimate [i](#)



The volume at the recommended contour level is 4210 nm³; this corresponds to an approximate mass of 3803 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum i

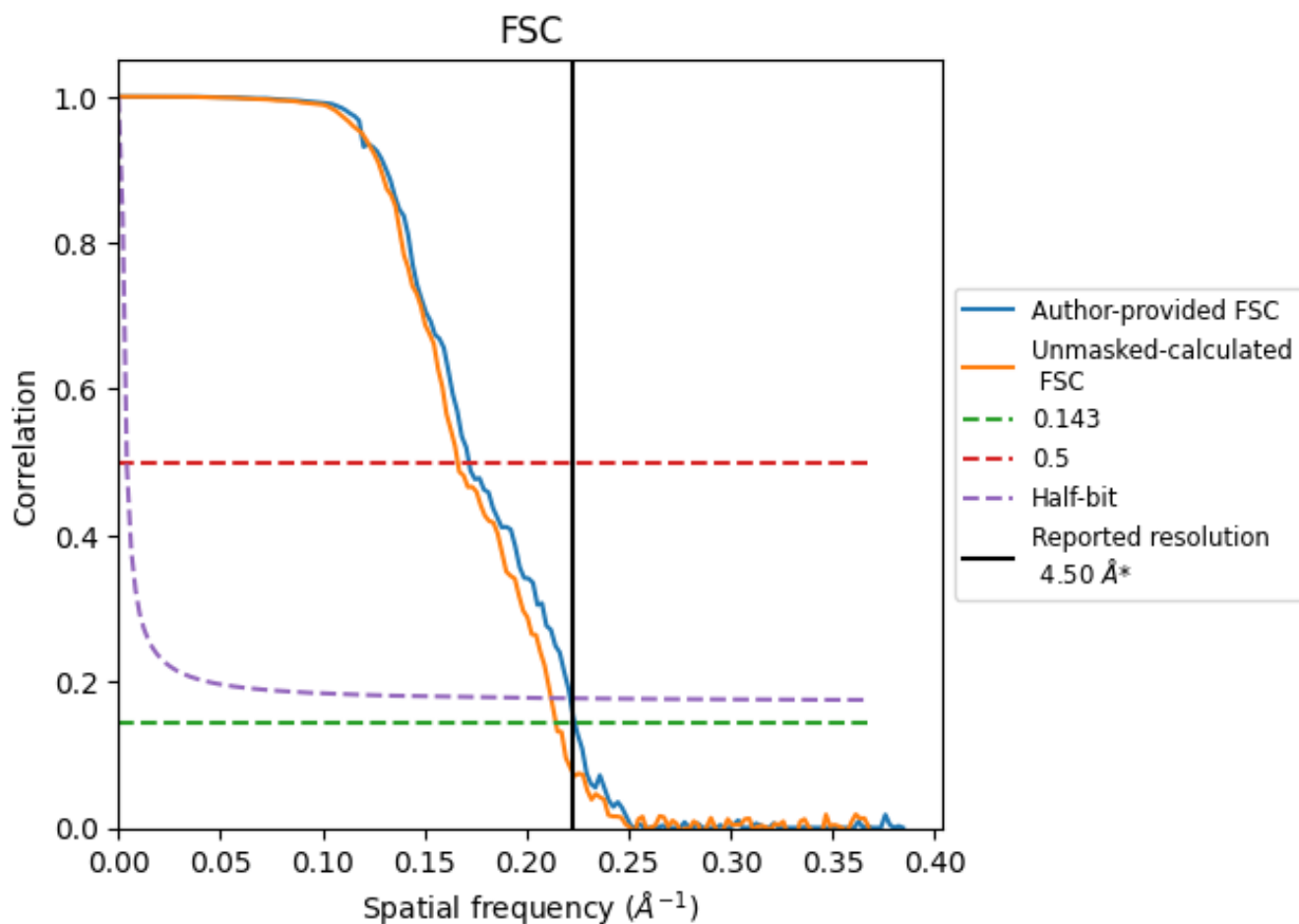


*Reported resolution corresponds to spatial frequency of 0.222 Å⁻¹

8 Fourier-Shell correlation [i](#)

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC [i](#)



*Reported resolution corresponds to spatial frequency of 0.222 Å⁻¹

8.2 Resolution estimates [i](#)

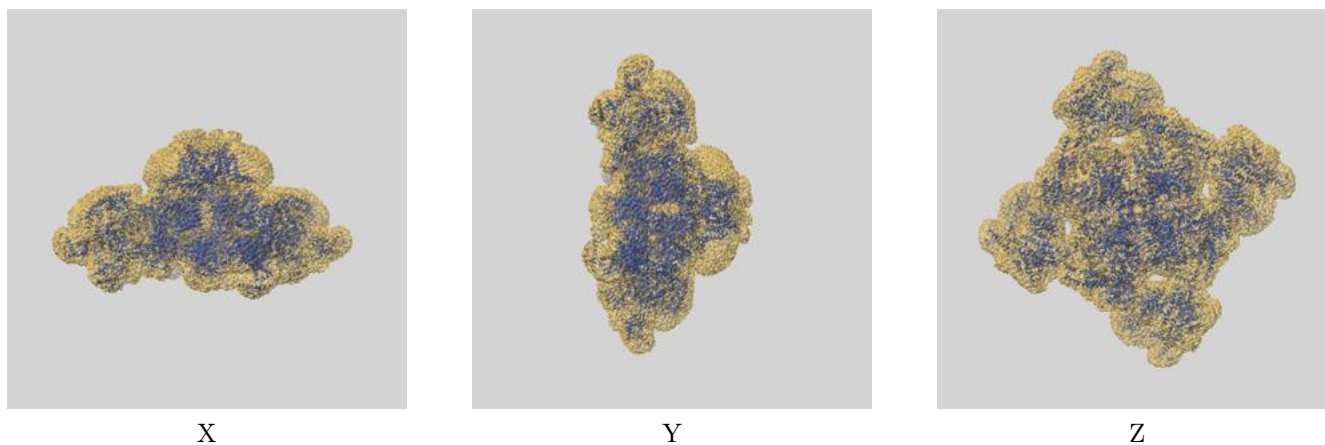
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	4.50	-	-
Author-provided FSC curve	4.47	5.82	4.52
Unmasked-calculated*	4.66	6.01	4.71

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps.

9 Map-model fit [i](#)

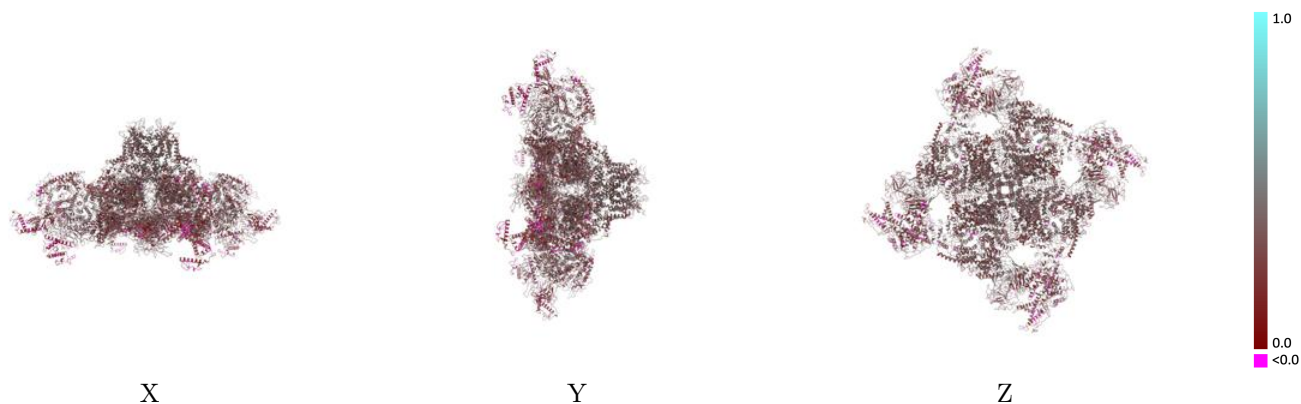
This section contains information regarding the fit between EMDB map EMD-22615 and PDB model 7K0S. Per-residue inclusion information can be found in section [3](#) on page [5](#).

9.1 Map-model overlay [i](#)



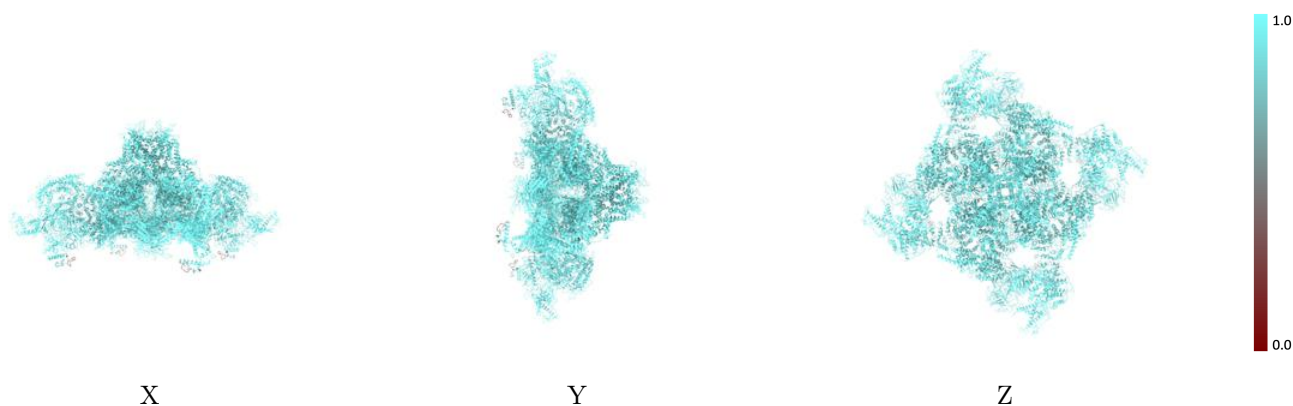
The images above show the 3D surface view of the map at the recommended contour level 0.006 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

9.2 Q-score mapped to coordinate model [i](#)



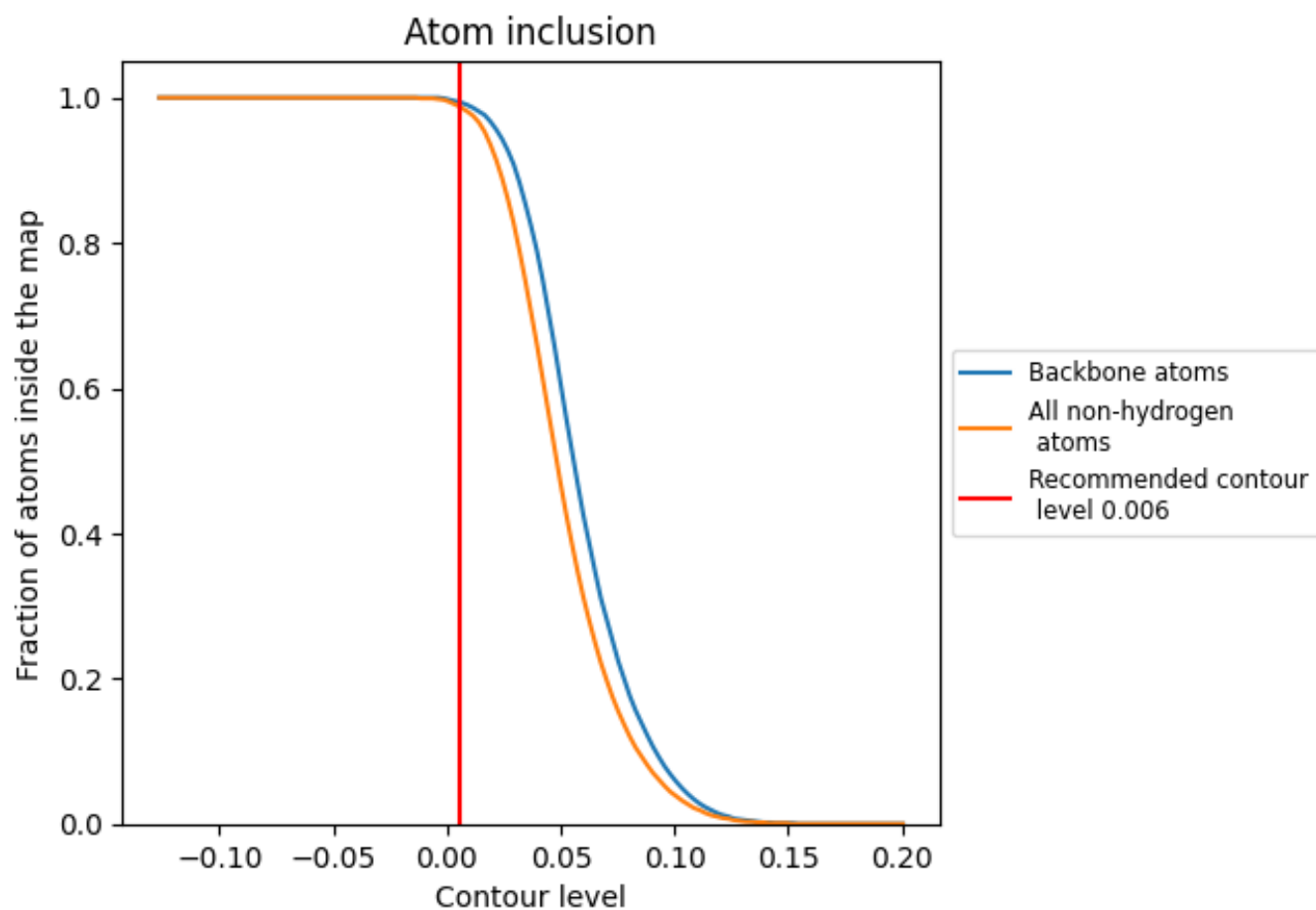
The images above show the model with each residue coloured according to its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

9.3 Atom inclusion mapped to coordinate model [i](#)



The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.006).




9.4 Atom inclusion [i](#)



At the recommended contour level, 99% of all backbone atoms, 99% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary [i](#)

The table lists the average atom inclusion at the recommended contour level (0.006) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	 0.9870	 0.3120
A	 0.9870	 0.3110
B	 0.9870	 0.3120
C	 0.9870	 0.3120
D	 0.9870	 0.3110

